HOW PSYCHOPATHIC TRAITS INFLUENCE HEART RATE VARIABILITY

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Ana Mª Jorquera Daniel (39433197-L)
Tutora: Pilar Segarra Cabedo

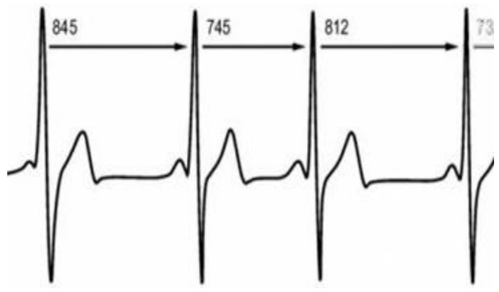
INTRODUCTION

Psychopathy is a personality disorder that is characterized by behavioral deviancy with distinctive interpersonal and emotional traits (cf. Skeem, Polaschek, Patrick, & Lilienfeld, 2011).

The **Psychopathic Personality Inventory** (PPI-R; Lilienfeld & Widows, 2005), is a self-report measure that evaluates psychopathic personality traits in non-penitentiary population. It contains eight subscales that can be grouped into two factors (Benning, Patrick, Hicks, Blonigen, & Krueger, 2003):

- **PPIR-Factor 1 (dominance/absence of fear):** positive social and psychological adjustment (educational attainment, sociability, executive functioning, adaptive emotion regulation).
- **PPIR-Factor 2 (egocentric impulsivity):** maladaptive behavioral tendencies including antisocial behavior, impulsivity, aggressiveness and distress.

Resting **Heart Rate Variability (HRV)** represents the change in the time interval between successive heartbeats.



HRV is related to the ability of the nervous system to respond properly to the changes in the environment, and this capacity is critical to emotional regulation (cf. Polyvagal Theory; Neurovisceral Integration Model).

High frequency (HF-HRV) power spectral component of HRV represents vagal tone, which is vital for social functioning and the maintenance of mental health (Appelhans & Luecken, 2006).

There are several factors that influence HF-HRV, such as age, gender, body mass index (BMI) and respiration (cf. Quintana & Heathers, 2014).

HF-HRV is related to the expression of psychopathology. Individuals with higher HF-HRV show a greater capacity for regulated emotional responding (Laborde, Mosley, & Thayer, 2017).

AIM

We examined the relationship between HF-HRV and PPIR-Factors in a sample of females, controlling the influence of age, BMI and respiration (EDR)

HYPOTHESIS

We expected that inter-individual differences in HF-HRV (as a measure of a better adaptation to the environment) were related to PPIR-Factor 1 scores

METHOD

- **Participants**.
  40 female undergraduates from Universitat Jaume I — ages between 19 and 28 (mean age 21) — assessed via the Psychopathic Personality Inventory (PPI-R).

- **Procedure.**
  HRV data was recorded continuously during 5-min resting period in a sound-attenuated and dimly lit experimental room while the subject was seated.

  ECG (lead II) was recorded at a 1000 Hz sampling rate using a Coulbourn V77-26 Isolated Bioamplifier.

  The variability within the intervals between beats (IBI) was obtained from the ECG records and analyzed in order to obtain HF-HRV using Kubios HRV version 2.2 software (Tarvainen et al., 2014).

  The logarithmic transformation was performed on the HF-HRV variable in order to establish a normal distribution in the model.

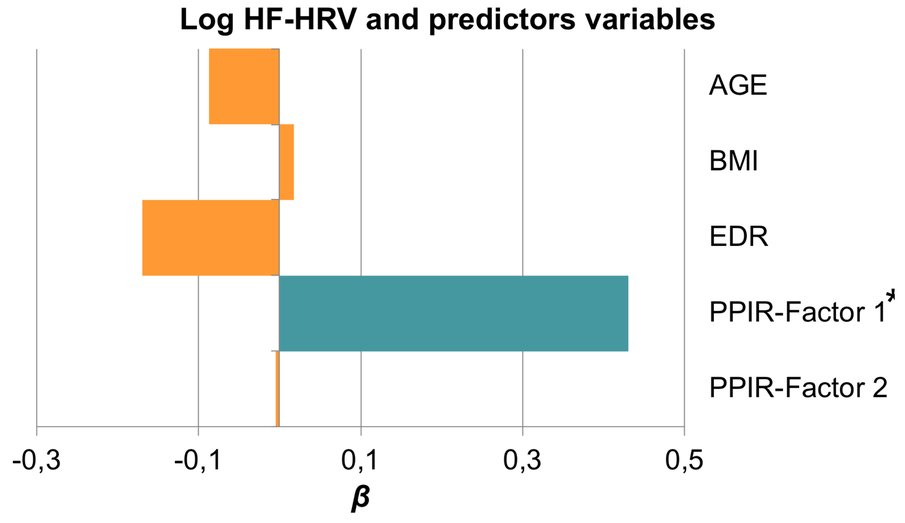
- **Analysis.**
  Multiple regression analysis was performed in IBM® SPSS Statistics S.

  Predictors: age, BMI, EDR, PPIR-Factor 1 and PPIR-Factor 2.

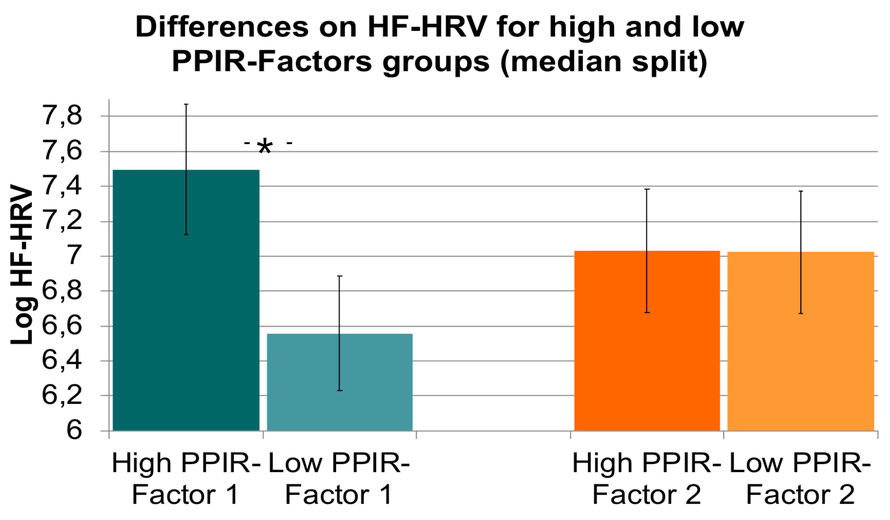
  Dependent variable: Log HF-HRV

RESULTS

	t	Sig	Standardized β coefficients
AGE	-0,553	0,584	-0,087
BMI	0,104	0,918	0,017
EDR	-1,047	0,302	-0,171
PPIR-Factor 1	**2,325**	**0,026**	**0,431**
PPIR-Factor 2	-0,007	0,994	-0,001



Only **PPIR-Factor 1 scores** predicted Log HF-HRV
(β = 0,43, explained 9,4% of variance, p < 0,5)



High scorers in PPIR-Factor 1 show higher Log HF-HRV than low scorers
[t (38) = -3,41, p = 0,0016]

CONCLUSIONS

As expected, we found that only PPIR-Factor 1 scores —and not PPIR-Factor 2— were associated with a higher HF-HRV.

Individuals with high PPIR-Factor 1 scores show greater HRV, and therefore, better emotional regulation and adaptation to the environment.

The fact that high PPIR-Factor 1 scores were also related to considerable benefits toward achieving successful life outcomes (e. g., Lilienfeld & Fowler, 2006), suggests that HRV might be an adaptive characteristic underlying subclinical psychopathy.

Future research will be necessary to determine if this characteristic might be a biomarker to differentiate successful vs. unsuccessful psychopaths.

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